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Pattern A, Achievement-Striving, and Scientific Merit:

Does Pattern A Help or Hinder?

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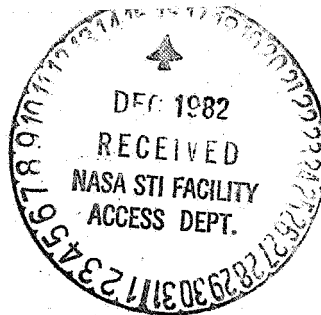
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Running head: Pattern A and Merit

Abstract

Clinical observations and recent theorizing offer two opposing predictions about the relationship between Pattern A and the merit of one's work: (a) Pattern A helps; (b) Pattern A hinders. To test these two possibilities, male members of the Society of Experimental Social Psychologists completed a measure of Pattern A behavior and citation scores were derived for each man from the Social Science Index 1973 - 1975. Assuming that citations are a rough measure of meritorious work, the results revealed that Type A behavior by men is associated with superior scientific work. Thus, it is unlikely Pattern A hinders meritorious work. Rather, it may help.

Pattern A, Achievement-Striving, and Scientific Merit:

Does Pattern A Help or Hinder?

A behavior pattern called "Type A" has become widely known for its negative effect on cardiovascular health. Both retrospective and prospective studies have demonstrated that Pattern A is associated with at least twice the occurrence of heart disease as an opposing Pattern B, which is defined as the absence of Pattern A (Friedman & Rosenman, 1974; Jenkins, Rosenman & Zyzanski, 1974). This relationship remains when statistical controls are introduced to partial out the effects of traditional risk factors for CHD, such as serum cholesterol level and systolic blood pressure. Moreover, Pattern A is associated with the degree of atherosclerosis in the coronary arteries in three out of four studies (Blumenthal, Williams, Kong et al., 1978; Frank, Heller, Kornfeld, et al., 1978; Dimsdale, Hackett, Hutter et al., 1978; Zyzanski, Jenkins, Ryan et al., 1976).

Behavioral Characteristics of the Type A

The Type A behavior pattern is defined as "...an action-emotion complex that can be observed in any person who is aggressively involved in a chronic, incessant struggle to achieve more and more in less and less time, and if required to do so, against the opposing efforts of other things or persons" (Friedman & Rosenman, 1974, p. 67). Systematic investigations by Glass and his colleagues have verified the existence of a number of behavioral manifestations of this behavior pattern (cf. Glass, 1977). For example, Type A's signal the passage of one minute sooner than do Type B's, apparently sensing time passing rapidly (Burnam, Pennebaker & Glass, 1975). When frustrated, Type A's become aggressive and hostile (Carver & Glass,

1978; Glass, Snyder, & Hollis, 1974). Type A's work at near their maximal rate even when there is no explicit time deadline (Burnam et al., 1975; Carver, Coleman, & Glass, 1976).

The effects of Type As' rapid work pace on the merit of their work are unclear. Friedman and Rosenman (1974) have observed that their Type A patients tend to sacrifice quality for quantity of work. They suggest that Type As' creativity and acuity of judgment may become impaired because of their unwillingness to take the time to ponder leisurely, to weigh alternatives, or to indulge in combining several seemingly independent notions in new ways. Consequently, Friedman and Rosenman are not surprised by their observation that presidents and top management of corporations are usually not Type A, but Type B individuals. Their clinical observations do have some empirical support. For example, Type A college students perform poorly on a simple psychomotor task that requires delayed responding (Glass, Snyder, & Hollis, 1974).

On the other hand, Friedman and Rosenman (1974) also note that Type A's are concerned about quality in one respect -- they value the esteem of superiors in their field. Presumably they do not value general reactions from others. Thus, it seems reasonable that Type A's would direct their efforts into producing superior work that wins the esteem of significant others. Consistent with this observation is the fact that Type A college students report achieving more academic honors than do Type B's (Glass, 1977). It seems reasonable to assume that academic honors are based on superior work. It is also the case that Type A's can overcome their characteristic fast pace

and slow down on a task that requires such, when they are threatened with a salient failure (Glass, 1977).

The primary purpose of the present study is to clarify the relationship of Pattern A and the merit of work. To do so, we examined the meritorious scientific work by a group of midcareer scientists. Our measure of merit was the number of citations by others to an individual's published work over a three year period. Although citation measures are obviously affected by factors other than the merit of the research, we chose this measure because of the difficulties inherent in defining merit apart from consensus of researchers in the same area and because of the accumulating evidence supporting the validity of citation measures. For example, a panel of expert psychologists nominated persons who made the most significant contribution to their field (Clark, 1967); the number of times an individual was nominated correlated .67 with citations. In another study, 24 percent of the 50 most cited authors in the 1973 Science Citation Index were Nobel Laureates (Wade, 1975; see Cole & Cole, 1971; Garfield, 1977; Myers, 1970). In a final exemplary study of social and personality psychologists, stronger relationships were found between citations and personality and demographic measures, e.g. quality of graduate institution and present employer, than between these factors and the number of publications (Helmreich, Spence, Beane, Lucker, & Matthews, in press). In other words, citations are not merely a measure of productivity and although it is true that an investigator must publish to be cited, publications do not imply that the investigator's work is meritorious. In brief, while the citation index is not without flaws, it, nonetheless, provides a useful measure of meritorious

research and allows an answer to the following question: Does Pattern A help or hinder scientific merit?

A second purpose of the present research is to investigate the relationship between Pattern A and need for achievement. Heckhausen (1967) defined achievement motivation as "...striving to increase, or keep high as possible one's own capabilities in all activities in which a standard of excellence is thought to apply (p. 5)". Although there is a strong resemblance between the descriptions of need for achievement and Pattern A, there is only a slight statistical relationship (Glass, 1977) unless one takes into account the multidimensional nature of either or both constructs (cf. Helmreich & Spence, 1978; Jackson, Ahmed, & Heapy, 1976). For example, in a sample of college undergraduates, Type A scores were only related to a combination of need for achievement and fear of failure (Matthews & Saal, 1978). As a further effort in this regard, we will examine the association of Pattern A and individual scientific merit along with the dimensions within the need for achievement construct.

Method

Subjects and Dependent Measures

The subjects are 118 male members of the Society of Experimental Social Psychology or SESP who returned an information packet that was sent to all male members of SESP in 1975 (N = 167 men).¹ The packet contained a biographical data sheet, the Jenkins Activity Survey for Health Predictions or JAS (Jenkins, Zyzanski, & Rosenman, 1971), and the Work and Family Orientation Scale (WFO: Helmreich & Spence, 1978).

Type A scores. The JAS scale yields an overall A-B score and three a priori factor scores: Factor H (Hard-driving competitiveness); Factor S (speed and impatience); and Factor J (job involvement). Although the scale is typically scored by a set of discriminant functions weights that were originally produced to maximize the association of the JAS and a standardized clinical interview assessment of Pattern A, we chose to use unit weighting scoring for two reasons: Unit weight scoring of JAS items correlated in the .90's with discriminant function weightings of JAS items (Helmreich, Note 1) and available construct validity data is based on the unit weight scoring of the JAS items (Glass, 1977). The total JAS scores can vary from 0 to 21 with a mean of about 8 in college student samples. Factors H and S scores are available from unit weight scoring of the JAS, but Factor J scores are not. The higher the score the more Type A the individual. Test-retest correlations of the total scores are generally between .60 and .70 across one to four year intervals in samples of employed, middle-aged men (Jenkins, 1978).

Achievement Measures: Work and Family Orientation Questionnaire (WFOQ). The WFOQ contains 23 items which are scored in such a way to yield three motivational scale scores: Mastery, Work, and Competitiveness (Helmreich & Spence, 1978).² The Mastery scale contains items describing a preference for challenging tasks, e.g., "If I am not good at something, I would rather keep struggling to master it than move onto something I may be good at." The Work scale contains positive attitudes toward work, e.g., "I like to work hard." Competitiveness describes a desire to win in interpersonal situations, e.g., "I enjoy working in situations involving competition with others." The reliability of the three WFOQ scales is adequate: the alpha coefficients for all three scales are above .62 in a sample of 1300 college students. The WFOQ scores predict such achieve-

ment outcomes as grades in school, income among businessmen, and scientific attainment (Helmreich & Spence, 1978; Helmreich et al., in press). Additional reliability and validity data on the WOFO are available elsewhere (Helmreich & Spence, 1978).

Citation & Productivity Measures. Two scores were derived to measure

meritorious work from the Social Science Index 1973 - 1975: (1) the annual mean number of times an individual's research was cited by others for the three year period, excluding self-citations; and (2) the annual mean number of self-citations. The productivity measure was the annual mean number of publications for the same three year period taken from the Source Index of the Social Science Citation Index.

Procedure

The information packets were mailed to potential participants in the summer of 1976. A majority of them were completed and returned within three months. Data were coded and added to a computer file as they arrived. When an individual's data bank was complete, identifying numbers were destroyed in order to preserve anonymity of the participants.

Results and Discussion

The reader may wonder at the outset if the nonresponders differed from the responders in any meaningful way. Available information on this point comes from analyses of responders and nonresponders in a large sample of subjects (Helmreich, et al., in press), which included the subjects in the present sample.³ The following demographic data were collected on all invited participants in the Helmreich et al., in press study: age, years since Ph.D., quality of graduate school institution, reputation of the department of current employer, and the three citation/productivity measures. Only the self-citation measure discriminated between groups: responders tended to cite themselves more than did nonresponders, $p < .05$.

Sample Characteristics

The sample in the present study is a group of midcareer scientists that are exceptional only in their achievements. As Table 1 reveals, these men are in their mid-40's, received their Ph.D. on the average when they were 28-years-old. In general, their achievement motivation scores are typical when compared to appropriate comparison groups. Only the competitiveness score is somewhat lower than a group ($N = 52$) of midcareer male non-psychologists (Helmreich & Spence, Note 2). The mean JAS scores are higher than mean scores of student groups residing in Kansas and Texas (e.g., Glass, 1977), but they are comparable to those residing in the northeast (Goldband, in press), where presumably most of these men also reside.

Insert Table 1 about here

Relationship between Pattern A and Achievement Motives

Table 2 shows the simple Pearson correlations between Pattern A and WOFO scores.⁴ Pattern A is substantially and positively associated with Mastery, Work, and Competitiveness scores, $ps < .01$. Thus, it appears that Pattern A is related to individual dimensions within the need for achievement construct: The more Type A the individual the more likely he is to prefer challenging tasks, to like work, and to be competitive in his orientation.

Insert Table 2 about here

These findings point to the utility of taking into account the multi-

dimensional nature of need for achievement in examining the association of Pattern A and this motivational construct. In contrast to the present study, previous studies have found only small, albeit statistically significant, associations between Pattern A and need for achievement (Glass, 1977). Global measures of need for achievement have not permitted the elucidation of the positive relationships between Pattern A and motives to master challenging tasks, to work hard, and to compete against others.

The association between JAS Type A and the Mastery scale scores is particularly noteworthy because of its unusual strength. Furthermore, the motivation to master even those tasks at which an individual is not proficient may be essential to the construct of Pattern A. Indeed Glass (1977) has suggested and provided empirical support for the notion that Pattern A is a response style for maintaining and asserting control over potentially uncontrollable events. The present data suggest a motivational underpinning of this behavioral style. Given the convergence of the present and Glass's data, it would be worthwhile to examine the interrelationship of Pattern A, motivation to master, and cardiovascular processes in other samples.

Relationship between Pattern A and Citation/Productivity Scores

The first step in examining the association of Pattern A and citation scores is to calculate the association of Pattern A and age of the scientist and the number of years since his Ph.D. was awarded because these latter two variables are related to the total number of citations, $p < .05$ (Helmreich et al., in press). Both age and years since Ph.D. are unrelated to any of the three JAS scores (see Table 2). Consequently, simple Pearson correlation coefficients of Pattern A and the citation and productivity scores were com-

puted and these are also presented in Table 2.

As this table reveals, the Type A scores in general bear positive relationships with the citation and productivity indices. Type A men, particularly those who score highly on the harddriving competitiveness component of Pattern A, tend to be cited often by others and to be productive during 1973 - 1975.

Another way to examine the present data is successively dichotomize the sample at the median of each citation/productivity score distribution. Then the mean JAS scores of each groups can be evaluated by anovas. This procedure has the advantage of presenting the data in a manner comparable to that of other studies so that the strength of the findings can be viewed in perspective. Accordingly, Table 3 presents the mean JAS scores of men who were cited above and below the median number of times in this sample.

Insert Table 3 about here

As this table reveals, men who were cited more often by others had higher Type A, Factor H, and Factor S scores than those who were cited less often. And, significance tests revealed that the effects were reliable for all three JAS measures. These findings gain interest because men who were more productive than the median of this sample during 1973 - 1975 did not have significantly higher JAS scores than those who were less productive, (Type A, $F = 1.1$; H, $F = 1.4$; S, $F = 2.4$) all $ps > .10$. This is not surprising because citations by others and productivity during the same three year period are unrelated, $r(116) = .14$, $p > .10$. In sum, the evidence suggests that

Pattern A is related to a meritorious scientific research and not only to the volume of work in this sample of men.

We must note at this point several qualifiers of the present findings. First, the sample contains only men. Extensive evidence suggests that men and women differ in their citations and that this difference cannot be accounted for by gender differences in tested personality and demographic variables related to excellence generally (Helmreich et al., in press; see also O'Connell, Alpert, Rotter, Ruble, & Unger, 1978; Hirschberg & Itkin, 1978). Consequently, the present findings should not be generalized to women and the relationship between Pattern A and meritorious scientific work by women is presently unknown.

A second qualifier is the retrospective nature of the study. Thus, one may suspect that Pattern A is a consequence rather than an antecedent of scientific merit. However, we do not believe that this is the case because Type A assessment is highly reliable across four years in a large group of middle aged, midcareer Caucasian men (Jenkins, 1978). In fact, it is likely that the men in the present sample would have scored slightly more Type A in the past because cross-sectional data has revealed that mean Type A scores are somewhat higher before than after the age of 40 (Waldron, Zyzanski, Shekelle, et al., 1977). In sum, it seems reasonable to conclude that Pattern A is associated with superior scientific work by men. Evidently, Pattern A does not hinder meritorious research. It may actually help.

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1. Helmreich, R. L. Unpublished data. University of Texas at Austin, 1979.
2. Helmreich, R. L., & Spence, J.T. Unpublished data, Univeristy of Texas at Austin, 1979.

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The correlation between citedness, Nobel prizes and academy memberships.

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Footnotes

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¹At the time of the mailing, 23 women were members of SESP and only 10 returned the forms completed. Because men and women differ in their citations and a sample size of ten women was deemed too small for analyses by sex, the data of the ten women were not included in the present analyses.

²A fourth WOFO scale, Personal Unconcern, has not proved to be useful in other research. Therefore, it is not included in this project.

³This study reported in Helmreich et al. (in press) contained the 118 participants in the present study as well as the nonresponders from SESP and 400 randomly selected Ph.D. holding psychologists of Division 8. Only the SESP participants completed the JAS. The focus of the Helmreich et al. study was to identify personality and demographic variables associated with scientific attainment.

⁴The association of the WOFO scores and citation scores are presented in detail elsewhere for the large sample (Helmreich et al., in press). Consequently they are not reported here.

Table 1

Sample Characteristics

<u>Measure:</u>	<u>Mean</u>	<u>Standard Deviation</u>
Age	42.9	8.7
Years Since Ph.D.	15.2	7.8
JAS Type A Score	10.3	3.4
Factor H	15.6	6.0
Factor S	22.2	7.2
Mastery	21.7	4.1
Work	21.1	3.3
Competitiveness	11.4	3.6
# Annual Citations	33.1	42.5
# Annual Self-Citations	4.7	6.8
# Annual Publications	1.9	1.5

Table 2

Correlation of JAS Scores and Demographic-Personality Variables

<u>Measure:</u>	<u>JAS SCORES</u>		
	<u>Type A</u>	<u>Factor H</u>	<u>Factor S</u>
Age	.02	.06	-.07
Years Since Ph.D.	.00	.04	-.09
Mastery	.47**	.46**	.35**
Work	.28**	.26**	.20*
Competitiveness	.26**	.27**	.35**
# Annual Citations ^a	.17*	.28**	.14
# Annual Self-Citations ^a	.05	.20*	.06
# Annual Publications ^a	.18*	.16*	.22*

* $p < .05$

** $p < .01$

^aThese scores were log transformed ($\log_e \bar{x} + 0.5$) because of the skewed distribution of scores on this sample.